The Road Inventory of Leavenworth National Fish Hatchery

Leavenworth, WA

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Federal Highway Administration
Central Federal Lands Highway Division
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INTRODUCTION

The Transportation Equity Act for the 21st Century (Public Law 105-178) created the Refuge Roads Program. Refuge roads are those public roads that provide access to or within a unit of the National Wildlife Refuge System and for which title and maintenance responsibility is vested in the United States Government. Funds from the Highway Trust Fund are available for refuge roads and can be used by the station to pay the cost of:

(a) Maintenance and improvements of refuge roads.
(b) Maintenance and improvements of:
    (1) Adjacent vehicle parking areas
    (2) Provision for pedestrians and bicycles and
    (3) Construction and reconstruction of roadside rest areas that are located in or adjacent to wildlife refuges
(c) Administrative costs associated with such maintenance and improvements.

The funds available for refuge roads are to be disbursed based on the relative needs of the various refuges in the National Wildlife Refuge System, and taking into consideration:

(a) The comprehensive conservation plan for each refuge;
(b) The need for access as identified through land use planning; and
(c) The impact of land use planning on existing transportation facilities.

To determine the relative needs of the U.S. Fish and Wildlife Service, the Federal Highway Administration (FHWA) was asked to inventory all public access roads and parking lots and provide a condition assessment of each. In 2008 the inventory was expanded to include administrative (service use only) roads and parking lots. An FHWA representative meets with refuge personnel to identify route segments and assign route numbers and functional classifications (See Appendix) for each route. All roads and parking lots are mapped using Trimble GPS units and visually assessed for condition using the RSL method of evaluation developed at Utah State University (See Appendix). Culverts, Gates, Guardrails and Low Water Crossings are also mapped and inspected for any obvious defects.

An estimate is provided, in year 2008 dollars, based on the condition determined by the rating system. Estimates are based upon data and location factors from the 2008 RS Means Heavy Construction Cost Data 22nd Annual Edition. Cost estimates should be evaluated on a case-by-case basis when being used for programming purposes.

Native Surfaced roads and parking lots already inventoried will not be re-inventoried and will not appear individually in report chapters 5, 6 and 8. Mileages and areas of native surfaced roads and parking lots will still appear in all summaries in the report and will remain in the road inventory database. In addition to this report, the FHWA will furnish the condition ratings of each route and segment to the Fish and Wildlife Service in a Microsoft Access database so the data can be included in their Real Property Inventory.

Leavenwoth NFH

Summaries

Route Miles and Percentages by Functional Class and Condition

Condition Rating (Based on RSL)*

	Excellent		Good		Fair		Poor		Failed		TOTAL
F. C.	MILES	%	MILES	%	MILES	%	MILES	%	MILES	%	MILES
I	0.34	54.8%	0.00	0.0%	0.28	45.2%	0.00	0.0%	0.00	0.0%	0.62
II	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
III	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
IV	0.00	0.0%	0.00	0.0%	0.18	100.0%	0.00	0.0%	0.00	0.0%	0.18
V	0.17	6.4%	0.97	36.3%	0.71	26.6%	0.82	30.7%	0.00	0.0%	2.67
Totals	**0.51**	**14.7%**	**0.97**	**28.0%**	**1.17**	**33.7%**	**0.82**	**23.6%**	**0.00**	**0.0%**	**3.47**

*For a description of condition ratings for the various surface types see the Appendix.

Route Miles and Percentages by Surface Type and Condition

Paved Condition Rating [Condition(RSL)]

	Excellent		Good		Fair		Poor		Failed		TOTAL
Surface	MILES	%	MILES	%	MILES	%	MILES	%	MILES	%	MILES
AS	0.40	16.2%	0.08	3.2%	1.17	47.4%	0.82	33.2%	0.00	0.0%	2.47
CO	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
Totals	**0.40**	**16.2%**	**0.08**	**3.2%**	**1.17**	**47.4%**	**0.82**	**33.2%**	**0.00**	**0.0%**	**2.47**

Unpaved Condition Rating [Condition(RSL)]

	Excellent		Good		Fair		Poor		Failed		TOTAL
Surface	MILES	%	MILES	%	MILES	%	MILES	%	MILES	%	MILES
GR	0.11	11.0%	0.89	89.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	1.00
NA	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
PR	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00	0.0%	0.00
Totals	0.11	**11.0%**	0.89	**89.0%**	0.00	**0.0%**	0.00	**0.0%**	0.00	**0.0%**	**1.00**

Square Footage (Parking Areas)

Condition Rating

	Excellent		Good		Fair		Poor		Failed		Total
	Square		Square		Square		Square		Square		Square
Surface	Feet	%	Feet	%	Feet	%	Feet	%	Feet	%	Feet
AS	0	0.0%	59,497	100.0%	0	0.0%	0	0.0%	0	0.0%	59,497
CO	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
GR	0	0.0%	0	0.0%	2,338	100.0%	0	0.0%	0	0.0%	2,338
NA	0	0.0%	0	0.0%	69,719	100.0%	0	0.0%	0	0.0%	69,719
PR	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
Totals	**0**	**0.0%**	**59,497**	**45.2%**	**72,057**	**54.8%**	**0**	**0.0%**	**0**	**0.0%**	**131,554**

Leavenworth NFH
Summaries

Route Miles and Percentages by Use Type and Condition

Road Condition Rating: Public/Administrative Use

USE TYPE	Excellent		Good		Fair		Poor		Failed		TOTAL MILES
	MILES	%	MILES	%	MILES	%	MILES	%	MILES	%	
Public (FC I-III)	0.34	54.8%	0.00	0.0%	0.28	45.2%	0.00	0.0%	0.00	0.0%	0.62
Admin (FC IV-V)	0.17	6.0%	0.97	34.0%	0.89	31.2%	0.82	28.8%	0.00	0.0%	2.85
Totals	**0.51**	**14.7%**	**0.97**	**28.0%**	**1.17**	**33.7%**	**0.82**	**23.6%**	**0.00**	**0.0%**	**3.47**

Parking Condition Rating: Public/Administrative Use

USE TYPE	Excellent		Good		Fair		Poor		Failed		Total Sq Ft
	Sq Ft	%	Sq Ft	%	Sq Ft	%	Sq Ft	%	Sq Ft	%	
Public	0	0.0%	44581	39.0%	69719	61.0%	0	0.0%	0	0.0%	114,300
Admin	0	0.0%	14916	86.4%	2338	13.6%	0	0.0%	0	0.0%	17,254
Totals	**0**	**0.0%**	**59,497**	**45.2%**	**72,057**	**54.8%**	**0**	**0.0%**	**0**	**0.0%**	**131,554**

Leavenworth National Fish Hatchery
ROUTE LOCATION MAP

Leavenworth NFH - 13225
Route Identification List

Shading Color Key:	White = Paved Routes
	Yellow = Unpaved Routes

RTE #	Asset Number	ROUTE NAME	RTE MI	ROUTE DESCRIPTION	PAVED MI	UN-PAVED MI	LANES	FC
010	10002579	Hatchery Road	0.19	From Icicle Road to Hatchery Parking (Route 900)	0.19	-	2	1
011	10002579	North Entrance Road	0.43	From Leavenworth Road to Hatchery Operations Road (Route 400)	0.43	-	2	1
300	10002579	Residence Road	0.18	From Hatchery Road (Route 010) to Well Road (Route 402)	0.18	-	2	4
400	10002579	Hatchery Operations Road	0.76	From Hatchery Parking (Route 900) to all roads within raceways	0.76	-	2	5
401	-	Island Road	0.82	From Hatchery Operations Road (Route 400) to well access	0.82	-	1	5
402	10049741	Well Road	0.89	From Hatchery Operations Road (Route 400) to FRO Parking (Route 800)	-	0.89	1	5
403	10049741	FRO Road	0.09	From Icicle Road to FRO Parking (Route 800)	0.09	-	2	5
404	10049741	Dam 5 Road	0.11	From Island Road (Route 401) to Dam 5	-	0.11	1	5

Leavenworth NFH - 13225

Route Identification List (Parking)

Shading Color Key:	White = Paved Routes
	Green = Unpaved Routes

Route #	Asset Number	ROUTE NAME	Area (Sq Ft)	ROUTE DESCRIPTION	Surface Type
800	10061117	FRO Parking	11,796	From FRO Road (Route 403)	Asphalt
801	-	Employee Parking	3,120	From Hatchery Operations Road (Route 400)	Asphalt
802	-	Intake Parking	2,338	From Icicle Road	Gravel
900	-	Hatchery Parking	32,427	From Hatchery Road (Route 010)	Asphalt
901	-	Fishing Access Parking	10,107	From North Entrance Road (Route 011)	Native
902	-	Fishing Access / Boat Landing Parking	59,612	From North Entrance Road (Route 011)	Native
903	-	Summer Theater Parking	12,154	From Hatchery Road (Route 010)	Asphalt

CHANGES TO THE FISH AND WILDLIFE SERVICE ROAD INVENTORY REPORT

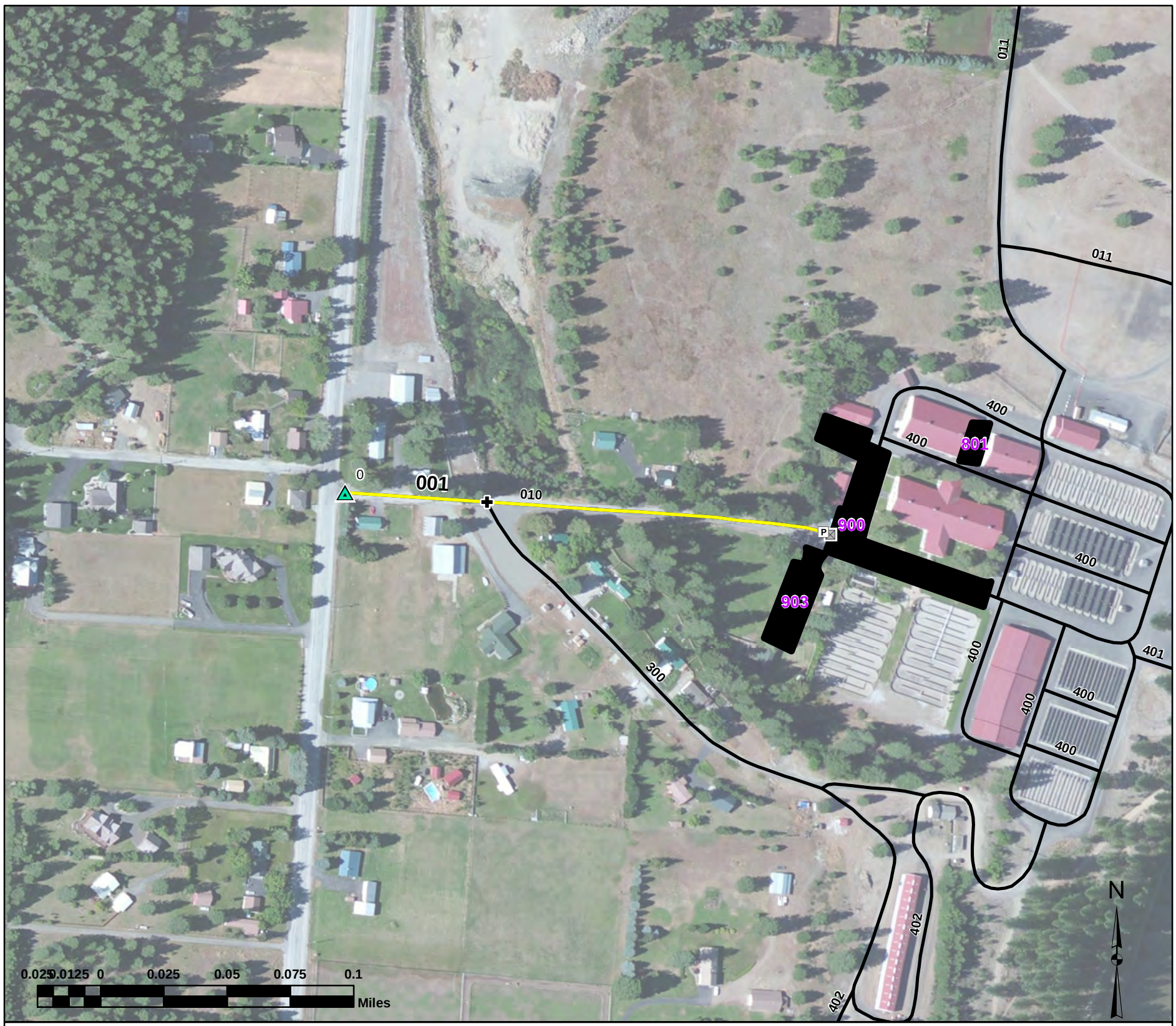
Leavenworth NFH

Routes added to previous inventory:		
Rte #	**Rte Name**	**Reason For Addition**
300	Residence Road	New Administrative Route
400	Hatchery Operations Road	New Administrative Route
401	Island Road	New Administrative Route
402	Well Road	New Administrative Route
403	FRO Road	New Administrative Route
404	Dam 5 Road	New Administrative Route
800	FRO Parking	New Administrative Route
801	Employee Parking	New Administrative Route
802	Intake Parking	New Administrative Route

Routes removed from previous inventory:		
Rte #	**Rte Name**	**Reason For Removal**
100	Fishing Access Road	Not open to the public

Routes modified from previous inventory:			
Rte #	**Rte Name**	**Type of Modification**	**Description of Modification**
11	North Entrance Road	Geometry Change	Sections Change
900	Hatchery Parking	Geometry Change	Increase in size

Comments:



Hatchery Road

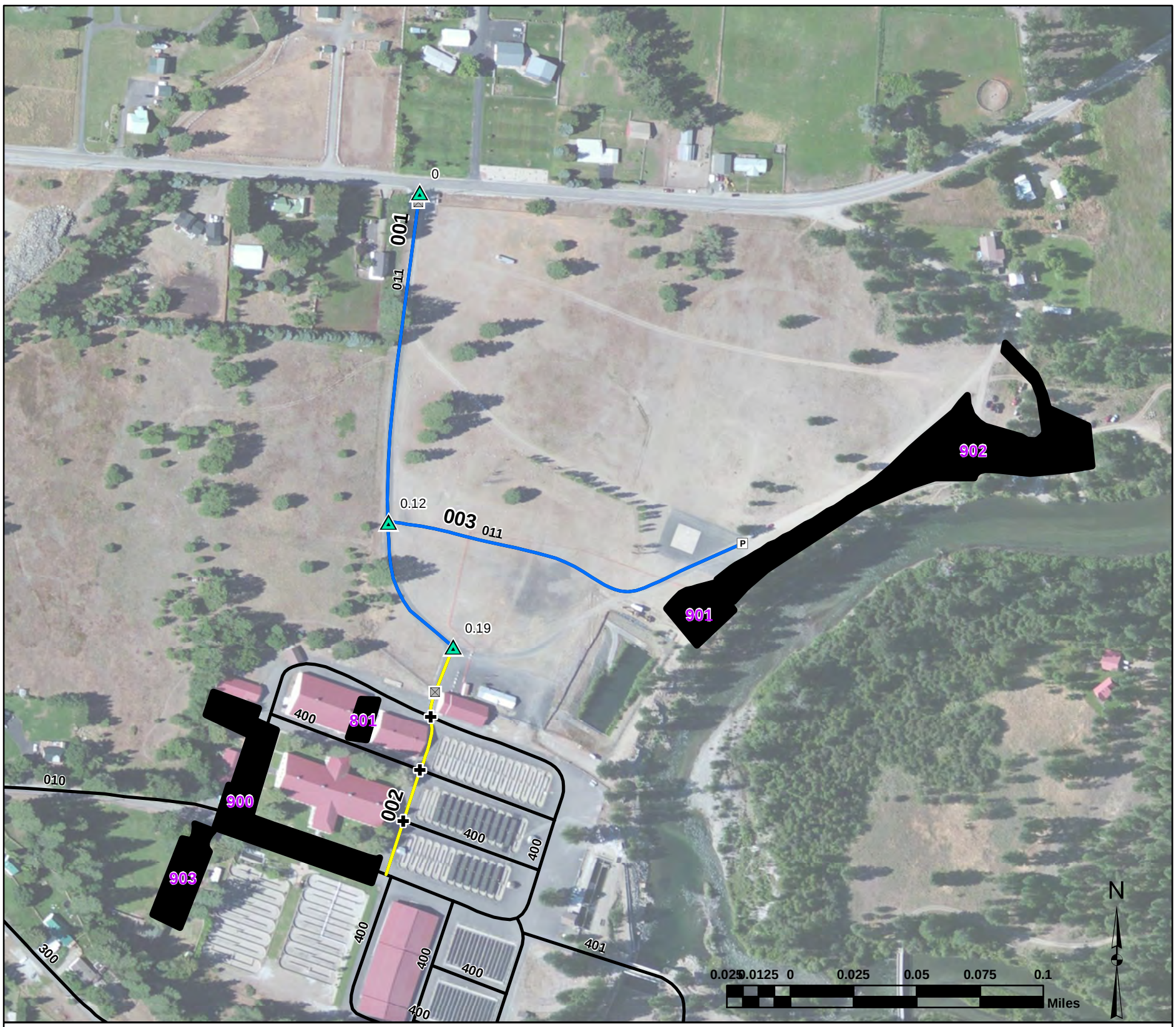
From Icicle Road to Hatchery Parking (Route 900)

Route Number: 010

Total Route Mileage: 0.19

Asset Number	10002579				
Section Number	001				
Section Length (miles)	0.19				
Inspection Date	03-14-2013				
Surface Type	Asphalt				
Number of Lanes	2				
Roadway Width (feet)	18				
Condition	Fair				
Remaining Service Life (years)	10				
Estimated Cost to Repair	$22,300				
Current Replacement Value	$247,300				

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Intersection	001-0.06						
Gate	001-0.19						
Turnout/Parking	001-0.19						



North Entrance Road

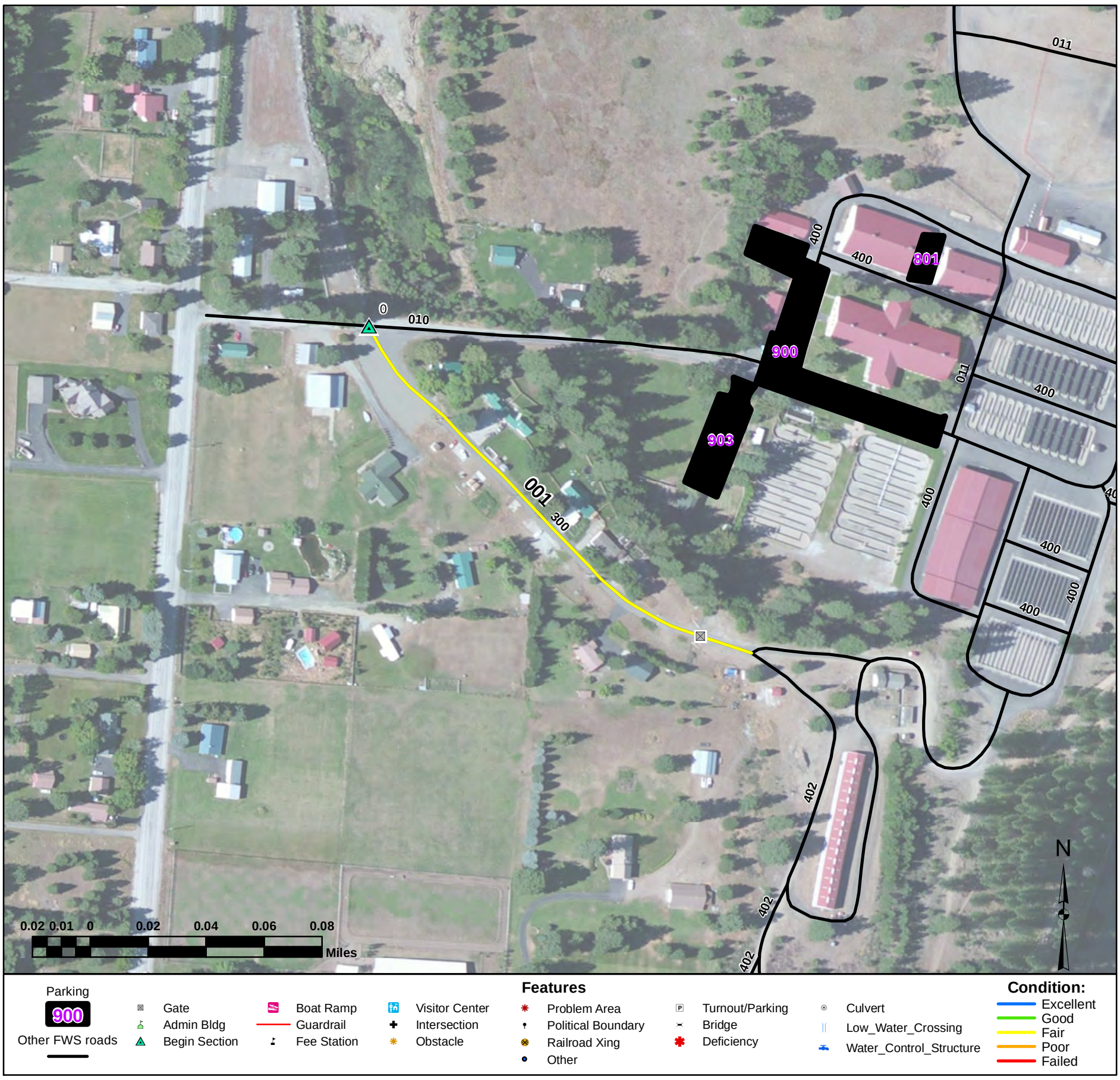
From Leavenworth Road to Hatchery Operations Road (Route 400)

Route Number: 011

Total Route Mileage: 0.43

Asset Number	10002579	10002579	10002579		
Section Number	001	002	003		
Section Length (miles)	0.19	0.09	0.15		
Inspection Date	03-14-2013	03-14-2013	03-14-2013		
Surface Type	Asphalt	Asphalt	Asphalt		
Number of Lanes	2	2	1		
Roadway Width (feet)	18	24	14		
Condition	Excellent	Fair	Excellent		
Remaining Service Life (years)	20	12	20		
Estimated Cost to Repair	$0	$10,600	$0		
Current Replacement Value	$247,300	$117,100	$195,200		

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Gate	001-0.0						
Begin Section	002-0.19						
Gate	002-0.21						
Intersection	002-0.22						
Intersection	002-0.24						
Intersection	002-0.26						
Begin Section	003-0.12						
Turnout/Parking	003-0.27						



Residence Road

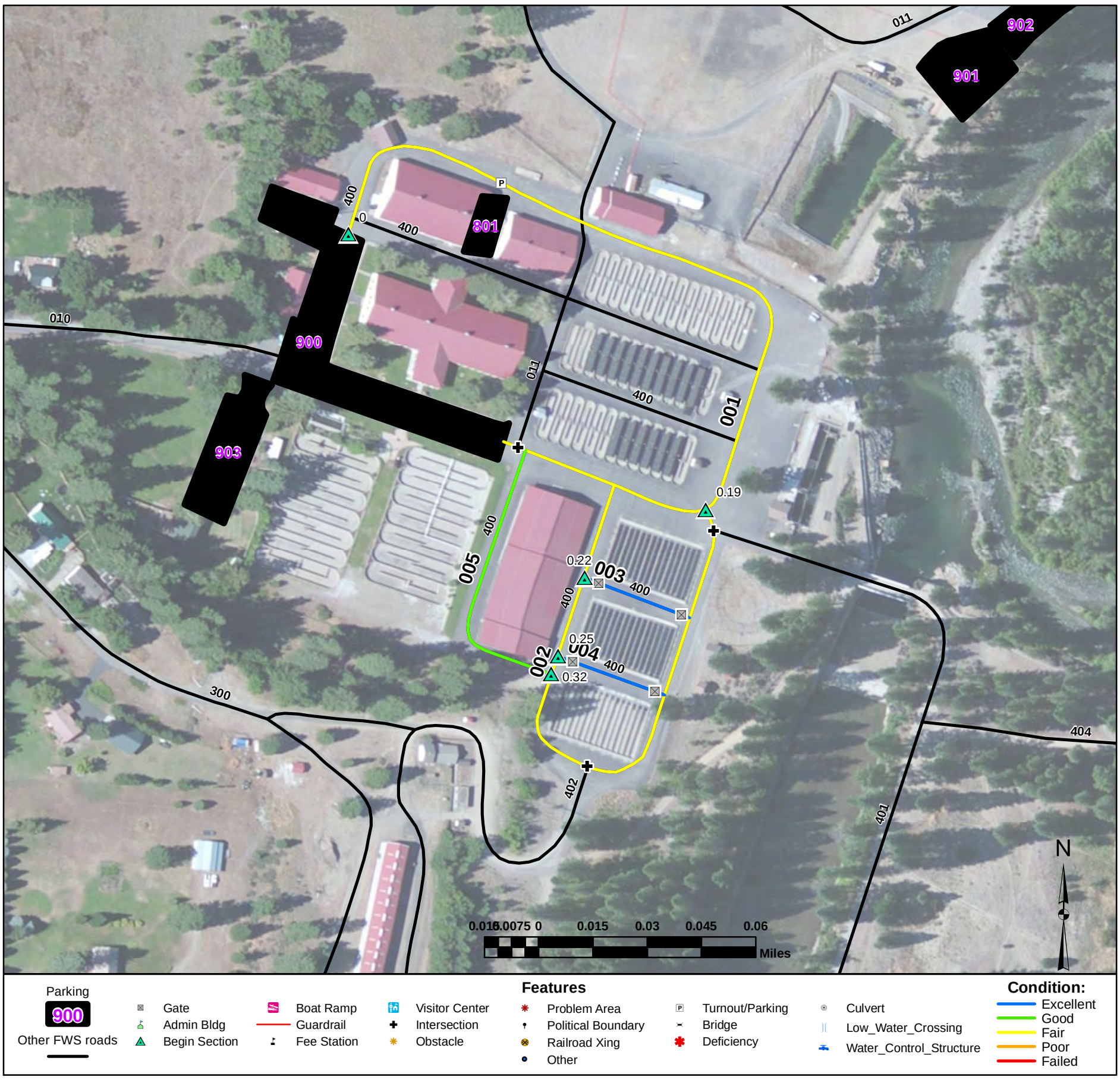
From Hatchery Road (Route 010) to Well Road (Route 402)

Route Number: 300

Total Route Mileage: 0.18

Asset Number	10002579				
Section Number	001				
Section Length (miles)	0.18				
Inspection Date	03-14-2013				
Surface Type	Asphalt				
Number of Lanes	2				
Roadway Width (feet)	16				
Condition	Fair				
Remaining Service Life (years)	12				
Estimated Cost to Repair	$21,200				
Current Replacement Value	$234,300				

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Gate	001-0.16						



Hatchery Operations Road

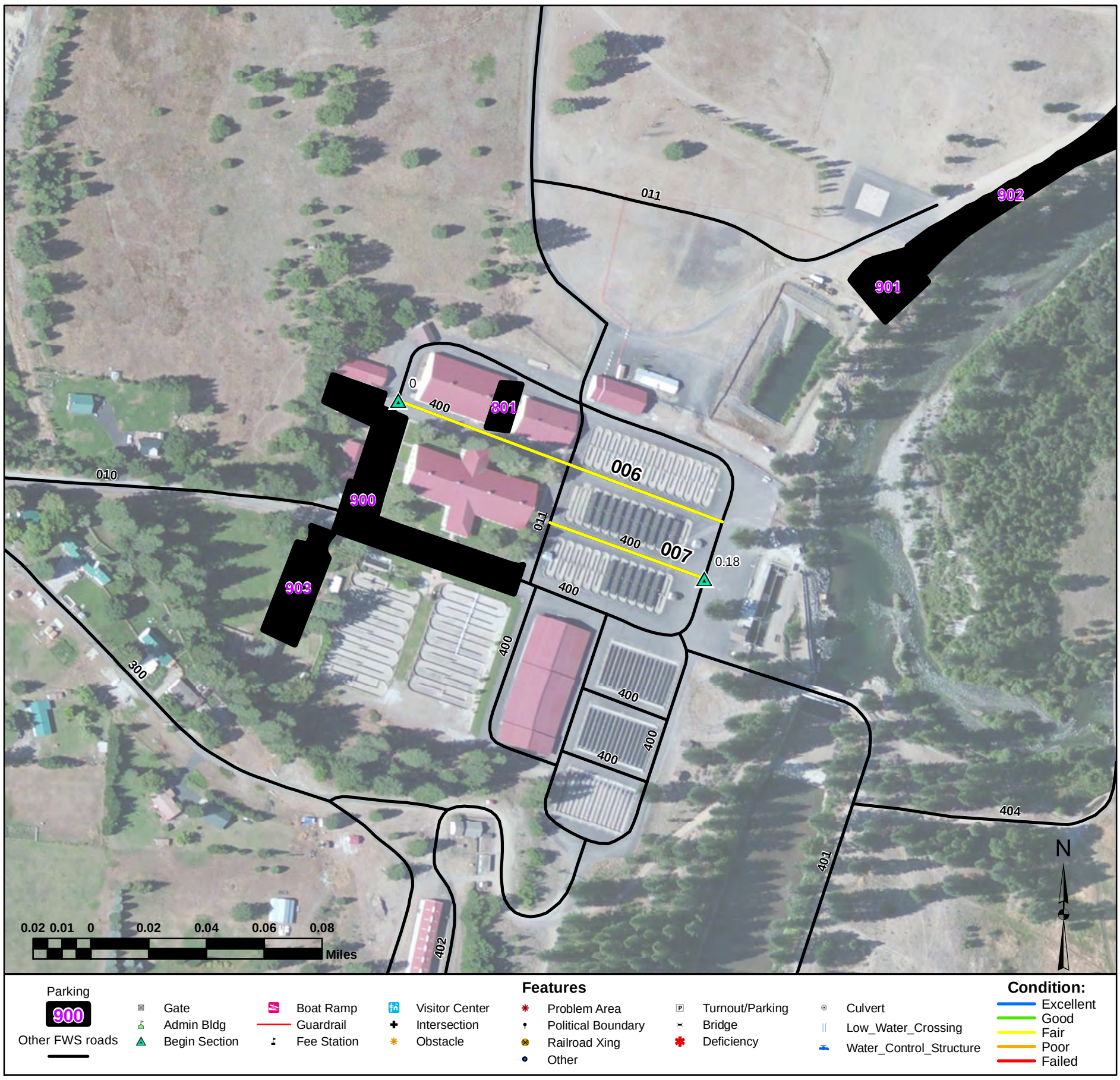
From Hatchery Parking (Route 900) to all roads within raceways

Route Number: 400

Total Route Mileage: 0.76

Asset Number	10002579	10002579	10002579	10002579	10002579
Section Number	001	002	003	004	005
Section Length (miles)	0.26	0.18	0.03	0.03	0.08
Inspection Date	03-14-2013	03-14-2013	03-14-2013	03-14-2013	03-14-2013
Surface Type	Asphalt	Asphalt	Asphalt	Asphalt	Asphalt
Number of Lanes	2	2	2	2	2
Roadway Width (feet)	40	20	20	20	16
Condition	Fair	Fair	Excellent	Excellent	Good
Remaining Service Life (years)	10	12	20	20	14
Estimated Cost to Repair	$30,600	$21,200	$0	$0	$1,700
Current Replacement Value	$338,400	$234,300	$39,000	$39,000	$104,100

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Turnout/Parking	001-0.06						
Intersection	001-0.28						
Begin Section	002-0.19						
Intersection	002-0.2						
Intersection	002-0.28						
Begin Section	003-0.22						
Gate	003-0.23						
Gate	003-0.25						
Begin Section	004-0.25						
Gate	004-0.25						
Gate	004-0.27						
Begin Section	005-0.32						



Hatchery Operations Road

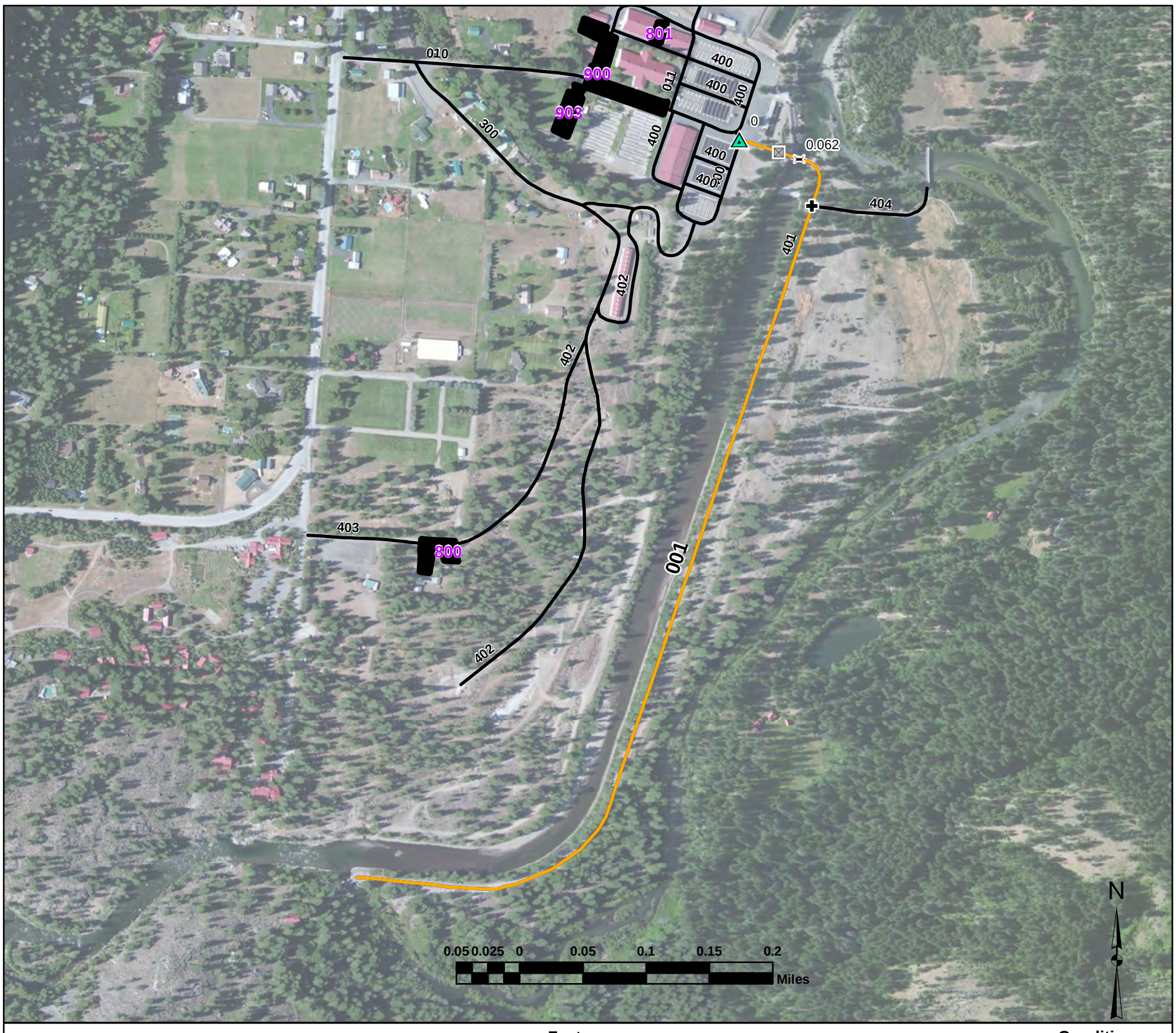
From Hatchery Parking (Route 900) to all roads within raceways

Route Number: 400

Total Route Mileage: 0.76

Asset Number	10002579	10002579			
Section Number	006	007			
Section Length (miles)	0.12	0.06			
Inspection Date	03-14-2013	03-14-2013			
Surface Type	Asphalt	Asphalt			
Number of Lanes	2	2			
Roadway Width (feet)	30	24			
Condition	Fair	Fair			
Remaining Service Life (years)	10	10			
Estimated Cost to Repair	$14,100	$7,100			
Current Replacement Value	$156,200	$78,100			

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	006-0.0						
Begin Section	007-0.18						



Island Road

From Hatchery Operations Road (Route 400) to well access

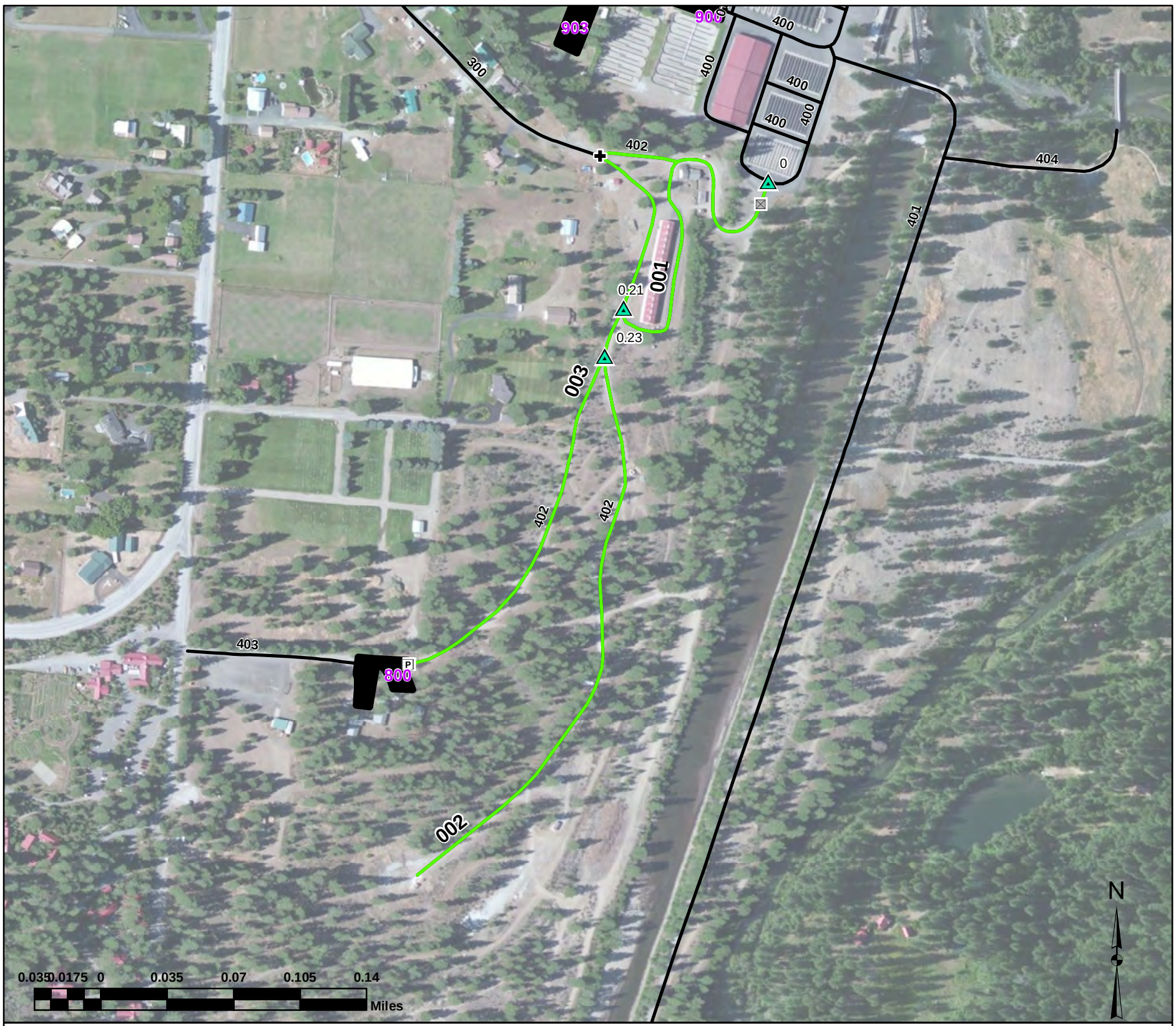
Route Number: 401

Total Route Mileage: 0.82

Asset Number	-				
Section Number	001				
Section Length (miles)	0.82				
Inspection Date	03-14-2013				
Surface Type	Asphalt				
Number of Lanes	1				
Roadway Width (feet)	14				
Condition	Poor				
Remaining Service Life (years)	6				
Estimated Cost to Repair	$525,800				
Current Replacement Value	$1,067,300				

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Gate	001-0.04						
Bridge	001-0.06						
Intersection	001-0.11						

ROUTE 402



Parking
900
Other FWS roads

Gate
Admin Bldg
Begin Section
Boat Ramp
Guardrail
Fee Station
Visitor Center
Intersection
Obstacle

Features
Problem Area
Political Boundary
Railroad Xing
Other
Turnout/Parking
Bridge
Deficiency
Culvert
Low_Water_Crossing
Water_Control_Structure

Condition:
Excellent
Good
Fair
Poor
Failed

Well Road

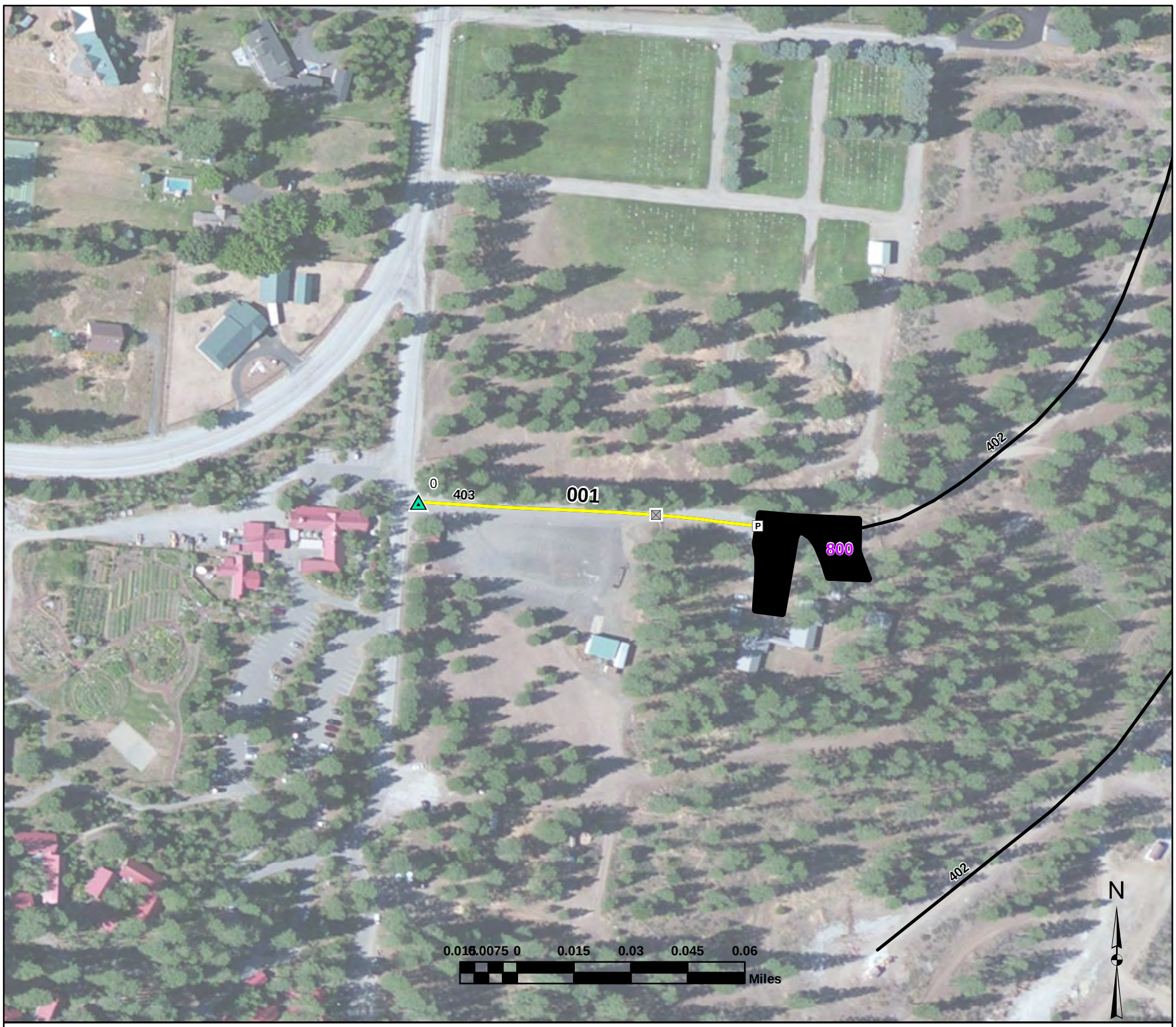
From Hatchery Operations Road (Route 400) to FRO Parking (Route 800)

Route Number: 402

Total Route Mileage: 0.89

Asset Number	10049741	10049741	10049741		
Section Number	001	002	003		
Section Length (miles)	0.35	0.34	0.20		
Inspection Date	03-14-2013	03-14-2013	03-14-2013		
Surface Type	Gravel	Gravel	Gravel		
Number of Lanes	1	1	1		
Roadway Width (feet)	14	14	10		
Condition	Good	Good	Good		
Remaining Service Life (years)	5	7	5		
Estimated Cost to Repair	$600	$600	$400		
Current Replacement Value	$262,600	$255,100	$150,100		

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Gate	001-0.01						
Intersection	001-0.3						
Begin Section	002-0.21						
Begin Section	003-0.23						
Gate	003-0.43						
Turnout/Parking	003-0.43						



FRO Road

From Icicle Road to FRO Parking (Route 800)

Route Number: 403

Total Route Mileage: 0.09

Asset Number	10049741				
Section Number	001				
Section Length (miles)	0.09				
Inspection Date	03-14-2013				
Surface Type	Asphalt				
Number of Lanes	2				
Roadway Width (feet)	20				
Condition	Fair				
Remaining Service Life (years)	10				
Estimated Cost to Repair	$10,600				
Current Replacement Value	$117,100				

Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						
Gate	001-0.06						
Turnout/Parking	001-0.09						

Dam 5 Road

From Island Road (Route 401) to Dam 5

Route Number: 404

Total Route Mileage: 0.11

Asset Number	10049741				
Section Number	001				
Section Length (miles)	0.11				
Inspection Date	03-14-2013				
Surface Type	Gravel				
Number of Lanes	1				
Roadway Width (feet)	12				
Condition	Excellent				
Remaining Service Life (years)	8				
Estimated Cost to Repair	$0				
Current Replacement Value	$82,500				

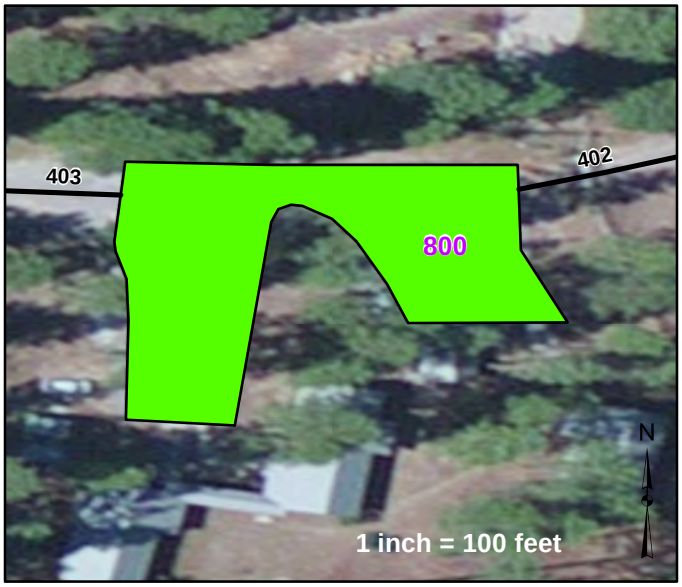
Features	Mile Post	Features	Mile Post	Features	Mile Post	Features	Mile Post
Begin Section	001-0.0						

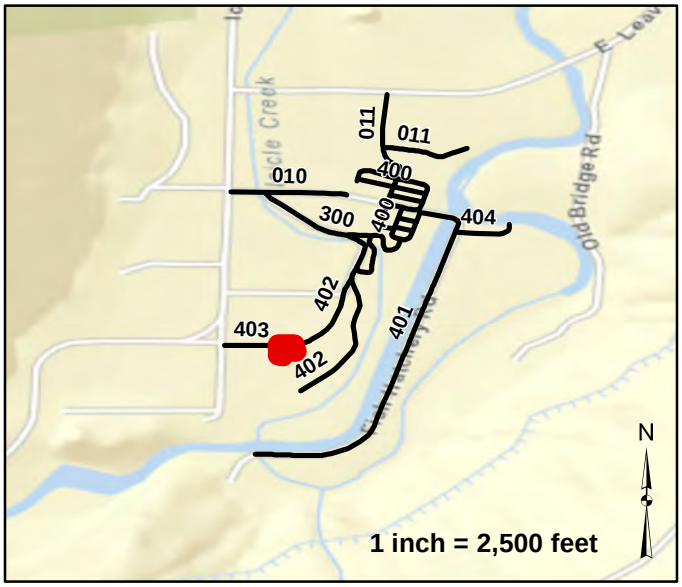
Route Number: 800

FRO Parking

From FRO Road (Route 403)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
10061117	11796	20	Good	Asphalt	$2,400	03-14-2013	$116,400





Parking

900

Other FWS roads

Gate

Admin Bldg

Begin Section

Features

Boat Ramp

Guardrail

Fee Station

Visitor Center

Other

Problem Area

Culvert

Low_Water_Crossing

Water_Control_Structure

Condition:

Excellent

Good

Fair

Poor

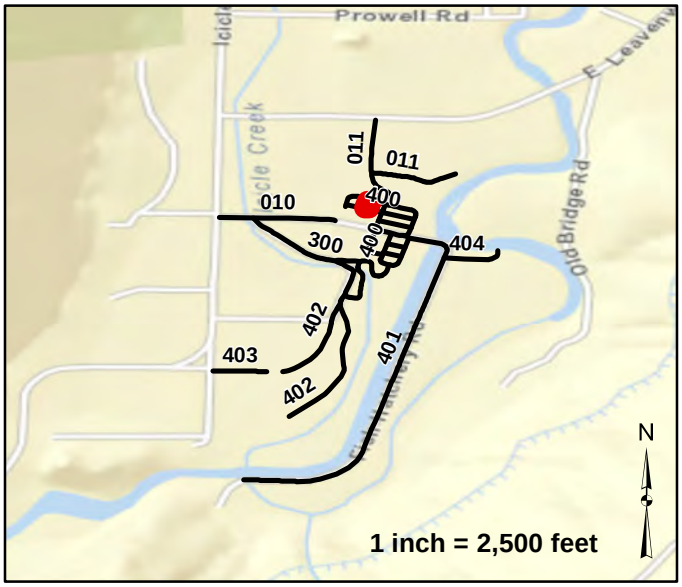
Failed

Route Number: 801

Employee Parking

From Hatchery Operations Road (Route 400)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
-	3120	34	Good	Asphalt	$600	03-14-2013	$30,800



Parking

900

Other FWS roads

Features

- Gate
- Admin Bldg
- Begin Section
- Boat Ramp
- Guardrail
- Fee Station
- Visitor Center
- Other
- Problem Area
- Culvert
- Low_Water_Crossing
- Water_Control_Structure

Condition:

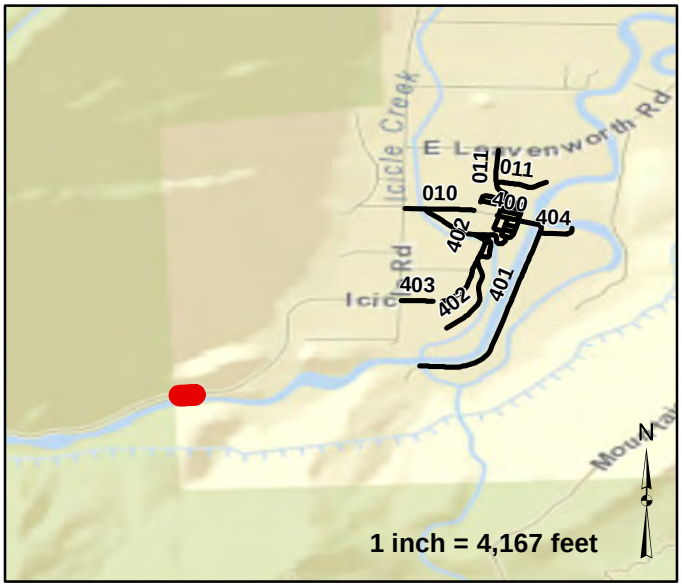
- Excellent
- Good
- Fair
- Poor
- Failed

Route Number: 802

Intake Parking

From Icicle Road

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
-	2338	5	Fair	Gravel	$700	03-14-2013	$12,600



Parking

900

Other FWS roads

Features

Gate
Admin Bldg
Begin Section
Boat Ramp
Guardrail
Fee Station
Visitor Center
Other
Problem Area
Culvert
Low_Water_Crossing
Water_Control_Structure

Condition:

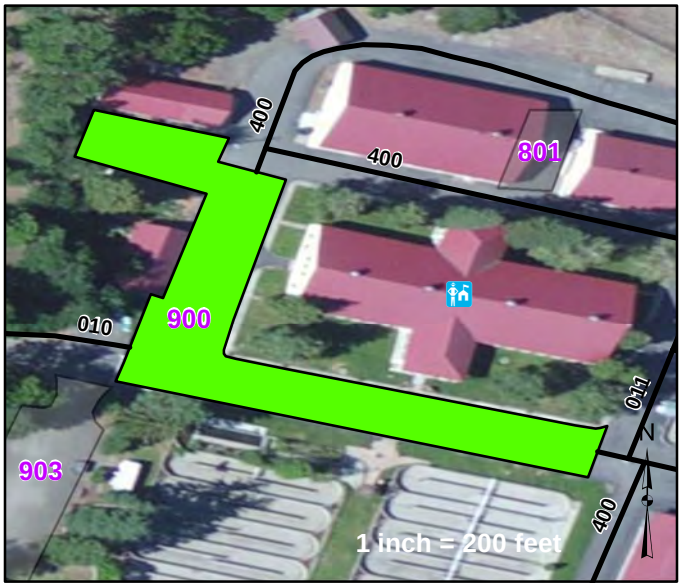
Excellent
Good
Fair
Poor
Failed

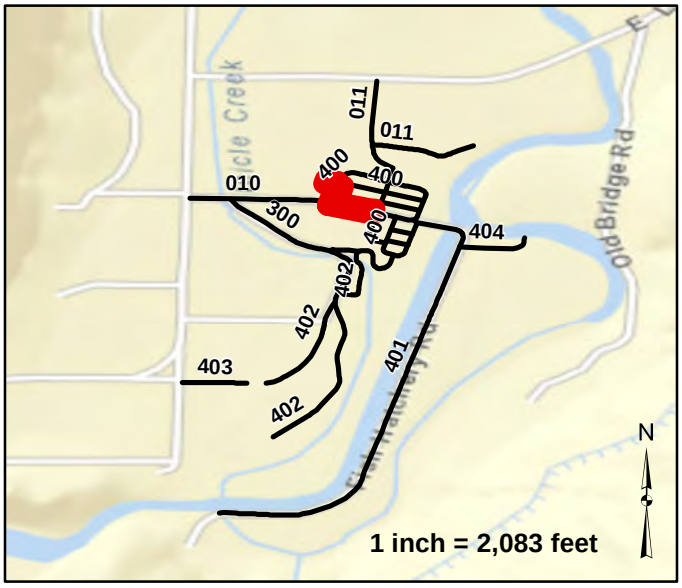
Route Number: 900

Hatchery Parking

From Hatchery Road (Route 010)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
-	32427	34	Good	Asphalt	$6,500	03-14-2013	$320,000





Parking

900

Other FWS roads

Gate

Admin Bldg

Begin Section

Features

Boat Ramp

Guardrail

Fee Station

Visitor Center

Other

Problem Area

Culvert

Low_Water_Crossing

Water_Control_Structure

Condition:

Excellent

Good

Fair

Poor

Failed

Route Number: 901

Fishing Access Parking

From North Entrance Road (Route 011)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
-	10107	6	Fair	Native	$2,900	06-08-2004	$23,500

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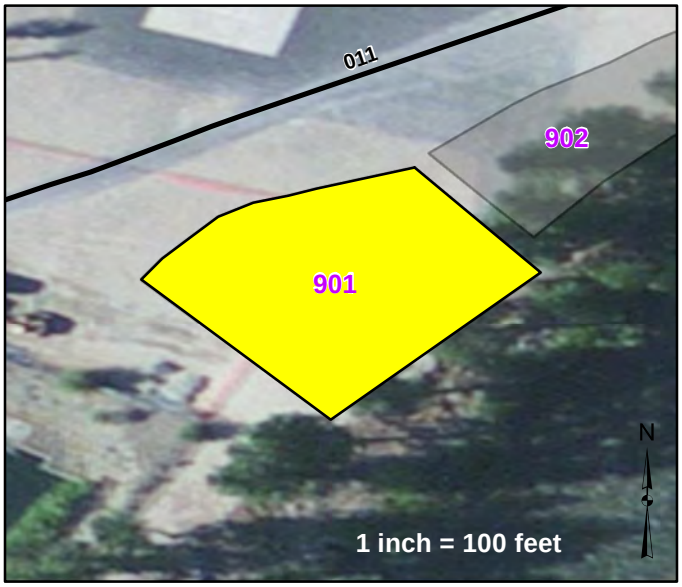

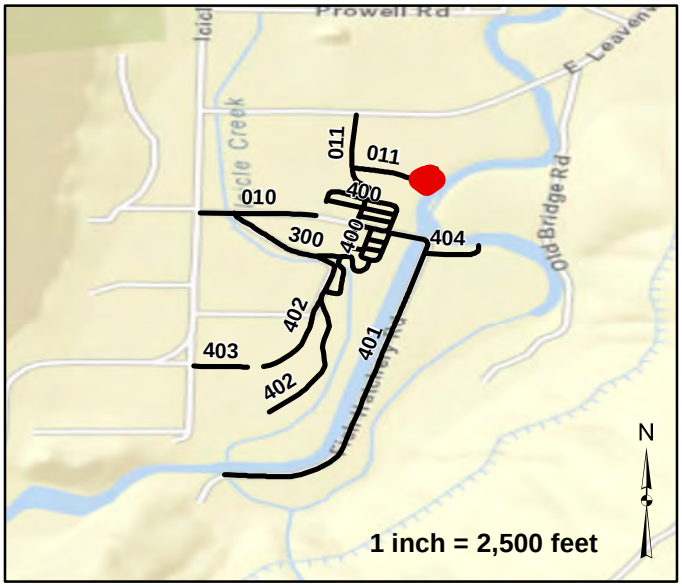

Parking

900

Other FWS roads

Gate

Admin Bldg

Begin Section

Features

Boat Ramp

Guardrail

Fee Station

Visitor Center

Other

Problem Area

Culvert

Low_Water_Crossing

Water_Control_Structure

Condition:

Excellent

Good

Fair

Poor

Failed

Route Number: 902

Fishing Access / Boat Landing Parking

From North Entrance Road (Route 011)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
-	59612	30	Fair	Native	$17,200	06-08-2004	$138,500

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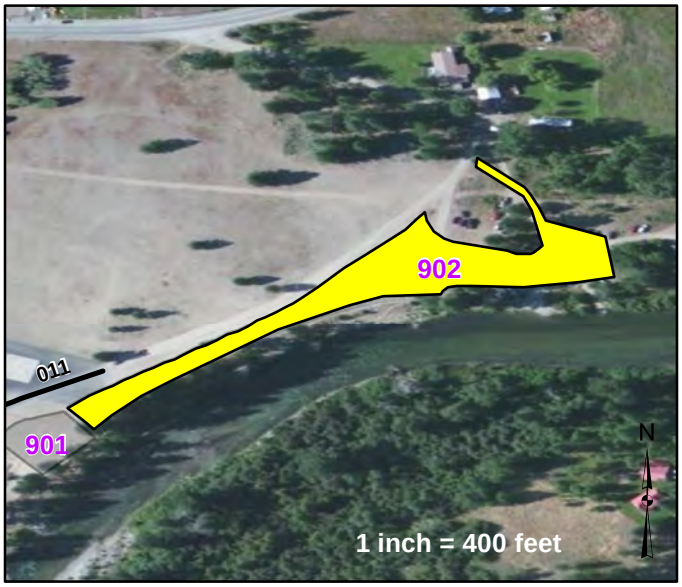
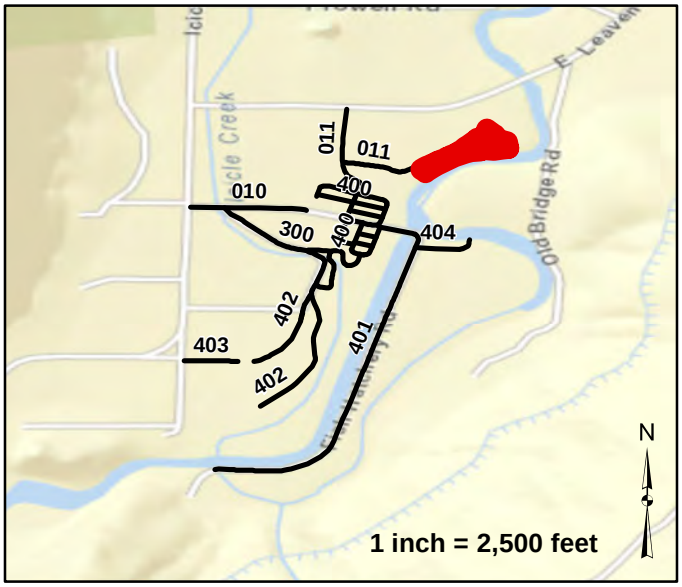




Parking

900

Other FWS roads

Features

Gate
Admin Bldg
Begin Section
Boat Ramp
Guardrail
Fee Station
Visitor Center
Other
Problem Area
Culvert
Low_Water_Crossing
Water_Control_Structure

Condition:

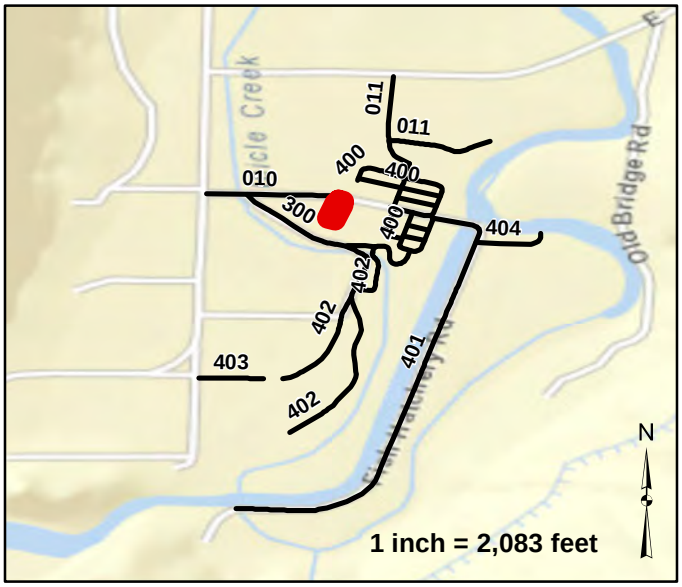
Excellent
Good
Fair
Poor
Failed

Route Number: 903

Summer Theater Parking

From Hatchery Road (Route 010)

Asset Number	Area (Sq Ft)	Spaces	Condition	Surface Type	Cost to Improve	Inspection Date	Current Replacement Value
-	12154	20	Good	Asphalt	$2,500	03-14-2013	$119,900



Parking

900

Other FWS roads

Gate

Admin Bldg

Begin Section

Features

Boat Ramp

Guardrail

Fee Station

Visitor Center

Other

Problem Area

Culvert

Low_Water_Crossing

Water_Control_Structure

Condition:

Excellent

Good

Fair

Poor

Failed

Leavenworth NFH - 13225 Bridge Inventory					
Rte #	Milepost	NBIS #	Sufficiency Rating	Functionally Obsolete	Structurally Deficient
401	0.06	000013225-0003	609	N	N

ROUTE: 010

Features Photographs

Photo: LEAV_C4_0094 Route: 010-001-0.0
Begin Section

Photo: LEAV_C4_0095 Route: 010-001-0.19
Metal Open Rail Gate

Features Photographs

Photo: LEAV_C4_0126 Route: 011-001-0.0
Begin Section

Photo: LEAV_C4_0127 Route: 011-001-0.0
Metal Open Rail Gate

Photo: LEAV_C4_0121 Route: 011-002-0.19
Begin Section

Photo: LEAV_C4_0120 Route: 011-002-0.21
Metal Chain Link Gate

Photo: LEAV_C4_0128 Route: 011-003-0.12
Begin Section

ROUTE: 300

Features Photographs

Photo: LEAV_C4_0110 Route: 300-001-0.0
Begin Section

Photo: LEAV_C4_0109 Route: 300-001-0.16
Metal Open Rail Gate

ROUTE: 400

Features Photographs

Photo: LEAV_C4_0111 Route: 400-001-0.0
Begin Section

Photo: LEAV_C4_0112 Route: 400-002-0.19
Begin Section

Photo: LEAV_C4_0113 Route: 400-003-0.22
Begin Section

Photo: LEAV_C4_0114 Route: 400-003-0.23
Metal Chain Link Gate

Photo: LEAV_C4_0115 Route: 400-003-0.25
Metal Chain Link Gate

Photo: LEAV_C4_0118 Route: 400-004-0.25
Begin Section

Features Photographs

Photo: LEAV_C4_0117 Route: 400-004-0.25
Metal Chain Link Gate

Photo: LEAV_C4_0116 Route: 400-004-0.27
Metal Chain Link Gate

Photo: LEAV_C4_0119 Route: 400-005-0.32
Begin Section

Photo: LEAV_C4_0122 Route: 400-006-0.0
Begin Section

Photo: LEAV_C4_0123 Route: 400-007-0.18
Begin Section

ROUTE: 401

Features Photographs

Photo: LEAV_C4_0100 Route: 401-001-0.0
Begin Section

Photo: LEAV_C4_0101 Route: 401-001-0.04
Metal Chain Link Gate

Photo: LEAV_C4_0102 Route: 401-001-0.06
Concrete Bridge NBIS:000013225-0003
Asset# 10002582

Features Photographs

Photo: LEAV_C4_0104 Route: 402-001-0.0
Begin Section

Photo: LEAV_C4_0105 Route: 402-001-0.01
Metal Chain Link Gate

Photo: LEAV_C4_0106 Route: 402-002-0.21
Begin Section

Photo: LEAV_C4_0107 Route: 402-003-0.23
Begin Section

Photo: LEAV_C4_0108 Route: 402-003-0.43
Metal Open Rail Gate

ROUTE: 403

Features Photographs

Photo: LEAV_C4_0089 Route: 403-001-0.0
Begin Section

Photo: LEAV_C4_0090 Route: 403-001-0.06
Metal Open Rail Gate

Features Photographs

Photo: LEAV_C4_0103 Route: 404-001-0.0
Begin Section

Accident Summary

Number of Accidents Reported	Timespan of Accidents	Injuries	Fatalities
0	No Accidents to Report	0	0

APPENDIX

FWS ROAD FUNCTIONAL CLASSIFICATION	
Class I	Principal Refuge Road (Public Roads) - Routes that constitute the main access route, main auto tour route, or thoroughfare for refuge visitors. These routes are accessible by 2WD vehicles. Routes are numbered from 10 to 99.
Class II	Connector Refuge Road (Public Roads) - Routes that provide circulation within the refuge. These routes can also provide access to areas of scenic, scientific, recreational or cultural interest, such as overlooks, campgrounds, education centers, etc. These routes are accessible by 2WD vehicles. Routes are numbered from 100 to 199.
Class III	Special Purpose Refuge Road (Public Roads) - Roads that provide circulation within special use areas such as campgrounds or public concessionaire facilities or access to remote areas of the refuge. These routes may not be 2WD accessible. Routes are numbered from 200 to 299
Class IV	Administrative Access Road (Administrative Roads) - Routes intended for access to administrative developments or structures such as maintenance offices, employee quarters, or utility areas. These routes are accessible by 2WD vehicles. These routes may restrict access to the general public. Routes are numbered from 300 to 399.
Class V	Restricted Road (Administrative Roads) - Routes normally closed to the public, such as maintenance roads, service roads, patrol roads, and fire breaks. These routes may be open to the public for a short period of time for a special use, such as hunting access. These routes may not be 2WD accessible. Routes are numbered from 400 to 499.

A refuge road system contains those routes within or giving access to a refuge or other unit of the FWS that are administered by the FWS, or by the Service in cooperation with other agencies. The assignment of a functional classification (FC) to a refuge road is not based on traffic volumes or design speed, but on the intended use or function of that route.

DESCRIPTION OF RATING SYSTEM

Rating Data is collected on five different surface types: Asphalt, Concrete, Gravel, Native Improved and Native Primitive. The Utah LTAP Center's Remaining Service Life (RSL) system is used for all surface types. The RSL system is based on the Strategic Highway Research Program's (SHRP) Distress Identification Manual.

Asphalt Rating System

Data is collected on the following distresses and conditions:

- **Fatigue Cracking** - Interconnected cracks forming small irregular shapes.
- **Longitudinal Cracking** - Cracks running parallel with the roadway, in the direction of traffic.
- **Transverse Cracking** - Cracks perpendicular to the roadway, going across the lane or lanes.
- **Block Cracking** - Interconnected cracks forming large blocks.
- **Edge Cracking** – Cracks running along the edge of the pavement surface.
- **Patches** - Original surface repaired with new asphalt patch material.
- **Potholes** - Holes or depressions in the pavement.
- **Rutting** - surface depressions in the wheel paths.
- **Roughness –** Evenness of pavement for serviceability.
- **Drainage** – Ability of the road surface to drain water based on proper slope.

A Condition Rating value is calculated for each homogenous pavement section, and can be up to 1 mile in length.

Rating Index Formula

Fatigue, longitudinal, transverse, block, and edge cracking, along with patching and potholes are rated on a 0 - 9 scale (0 = no distress, 9 = maximum distress). The rating given is based on the extent and the severity of the distress. Rutting, roughness, and drainage are rated on a 0 - 3 scale (0 = excellent, 3 = poor). Each distress type has a given Remaining Service Life (RSL) value (in years) based on the rating for that distress. The distress rating resulting in the lowest RSL value is considered to be the governing distress. That value is assigned as the RSL of the road segment.

Concrete Rating System

Data is collected on the following distresses and conditions:

- **Spalling of Joints** – Chipping, breaking, or cracking of slab edges
- **Joint Seal Damage** – Any damage or condition that enables materials or water to infiltrate into the joint from the surface.
- **Corner Breaks** – A portion of the slab separated by a crack that intersects the adjacent transverse and longitudinal joints, forming approximately a 45° angle to the direction.
- **Broken Slabs** – Faulting and/or cracking localized to individual slabs.
- **Faulting** – Difference in elevation across a crack or joint.
- **Longitudinal Cracking** – Cracks in the pavement running parallel to road.

- **Transverse Cracking** - Cracks in the pavement running perpendicular to the direction of traffic.
- **Patch Deterioration** – Faulting, settling, or cracking of previously placed patch
- **Map Cracking** – A series of cracks that extend only into the upper surface of the Slab

A Condition Rating value is calculated for each homogenous pavement section, and can be up to 1 mile in length.

Rating Index Formula
The rating procedure for concrete pavement is the same as that for asphalt pavement described previously. Each of the distresses described above are rated on the same 0 – 9 scale. The governing distress is then determined and the RSL associated with that distress is assigned to the road segment.

Gravel and Native Improved Rating System

Data is collected on the following distresses and conditions:
- **Cross Section (Gravel, Native Improved only)** - Roadway built so that the center is higher than the
  shoulder, to prevent water from pooling on roadway.
- **Roadside Drainage (Gravel, Native Improved only)** - Roadside ditches and culverts to handle water flow and
  prevent pooling on the roadside.
- **Corrugations (Washboarding)** - Small trenches or holes developing perpendicular to the roadway.
- **Potholes** - Holes or depressions in the roadway.
- **Rutting** - Depressions running parallel with the roadway, in the wheelpaths.
- **Dust** - Amount of dust caused by traffic.
- **Loose Aggregate (Gravel Only)** - Loose gravel, typically piled up on the roadway edges or centerline.

A Condition Rating value is calculated for each homogenous pavement section, and can be up to 1 mile in length.

Rating Index Formula
The rating procedure for unpaved roads is the same as that for asphalt and concrete pavements described previously. Of the distresses described above, corrugations, potholes, rutting, and loose aggregate are rated on the same 0 – 9 scale previously mentioned. Cross section, roadside drainage, and dust are rated on the same 0 – 3 scale described for asphalt pavement. The governing distress is then determined and the RSL associated with that distress is assigned to the road segment.

Condition Descriptions by Surface Type

The following definitions are used to describe pavement condition for the various surface types. These are general guidelines for condition indications.

Asphalt

Excellent – Recently constructed or overlaid road where construction or overlay was performed correctly- No maintenance required. RSL = 19-20 years.

Good – Low extent longitudinal and transverse cracks. All cracks are 1/4" or less with little or no crack erosion. Patches are in good condition and applied correctly. Routine Maintenance recommended. RSL = 13-18 years.

Fair - Roads are in good structural condition with little or no fatigue cracking. Longitudinal, transverse, and edge cracking is at medium extent and severity. Block cracking is not extensive. Any patches are in good condition. Preventative maintenance recommended. RSL = 7-12 years.

Poor - Road beginning to show signs of structural distress. Fatigue cracking is medium to high extent and medium severity. Cracking will be severe. Surface may have severe block cracking and show. Patches are in fair to poor condition. There is moderate distortion or rutting and occasional potholes. Rehabilitation recommended. RSL = 1-6 years.

Failed - Road is severely deteriorated. Signs of structural failure appear along with severe and extensive fatigue cracking, distortion, potholes, or extensive patches in poor condition. Reconstruction recommended. RSL = 0 years.

Concrete

Excellent - New pavement. No maintenance required. RSL = 19-20 years

Good - First signs of transverse cracking, patch or repair, more extensive pop-outs, or scaling. Sealing or routine maintenance recommended. RSL = 13-18 years.

Fair – Pavement has join or crack spalling, and/or faulting, along with cracking at corners with broken pieces. Any Patches are in fair condition and faulting is at a minimum. Preventative maintenance recommended. RSL = 7-12 years.

Poor - Joints and cracks are open 1 inch, spalled, or patched. Faulting is more severe. Rehabilitation recommended. RSL = 1-6 years.

Failed - Most slabs have failed structurally, and faulting is severe. Reconstruction recommended. RSL = 0 years.11-9

The following table shows the relationship between RSL and condition.

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE (Asphalt and Concrete Pavements)								
	FAILED	POOR		FAIR		GOOD		EXCELLENT
RSL Years	0	1-3	4-6	7-9	10-12	13-15	16-18	19-20

Gravel and Native

Excellent - Newly constructed road that has been constructed properly with proper crown, drainage and gravel layer. Little or no distress. No maintenance recommended. RSL = 8-10 years.

Good - Crown, drainage provisions, and gravel layer are in good condition. Distress limited to traffic effects such as dust, loose aggregate, and low severity corrugations (wash boarding). RSL = 5-7 years.

Fair - Adequate drainage and crown through majority of roadway. Crown repair, ditch improvement may be necessary. Road has more severe corrugations and potholes. Preventative maintenance recommended. RSL = 3-4 years.

Poor - Travel at slow speeds is necessary. Additional gravel layer needed to carry traffic. Poor crown. Ditching is inadequate and rutting is extensive and severe. Rehabilitation recommended. RSL = 1-2 years.

Failed - Travel is difficult, and road may be closed at times. Rutting and Corrugations are very severe. Total Reconstruction of road is recommended. RSL = 0 years.

The following table shows the RSL values for gravel and native roads in terms of excellent,good, fair, poor, and failed condition.

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE (Gravel and Native Surfaces)					
	FAILED	POOR	FAIR	GOOD	EXCELLENT
RSL Years	0	1-2	3-4	5-7	8-10

NATIVE PRIMITIVE/IMPROVED RATING SHEET

Cross Section (Crown)*

Severity	Condition		Description
	No Defects	0	Crown 4-6" with no restriction of water flow from centerline to ditch.
	Minor Defects	1	Inadequate or inconsistent crown. Drainage to ditch may be restricted.
	Moderate Defects	2	Flat crown, drainage to ditch restricted.
	Major Defects	3	Reverse crown, bowl-shaped road, drainage on roadway

Rutting

Severity	No Defects	Extent (Length) Low <10%	Med 10-30%	High >30%
Low < 6"		1	2	3
Med 6-12"		4	5	6
High > 12"		7	8	9

Roadside Drainage*

Severity	Condition		Description
	No Defects	0	Wide, deep ditches (>4') with no restriction to water flow.
	Minor Defects	1	Adequate ditches (>2' deep), minor obstructions restrict water flow.
	Moderate Defects	2	Shallow, narrow and obstructed ditches. Minor erosion of road.
	Major Defects	3	No ditch, drainage on roadway with moderate to severe erosion.

Potholes

Severity	No Defects	Extent (Area) Low <10%	Med 10-30%	High >30%
Low < 6"		1	2	3
Med 6-12"		4	5	6
High > 12"		7	8	9

Dust

Severity	Condition		Description
	No Defects	0	No obstruction to sight distance.
	Minor Defects	1	Sight distance > 550'
	Moderate Defects	2	Sight distance 225'-550'
	Major Defects	3	Sight distance < 225'

Corrugations

Severity	No Defects	Extent (Length) Low <10%	Med 10-30%	High >30%
Low < 3"		1	2	3
Med 3-6"		4	5	6
High > 6"		7	8	9

* Crown and Drainage are not rated for roads that have no constructed crown or drainage. This applies to Native and Gravel roads.

GRAVEL RATING SHEET

Cross Section (Crown)

Severity	Condition		Description
	No Defects	0	Crown 4-6" with no restriction of water flow from centerline to ditch.
	Minor Defects	1	Inadequate or inconsistent crown. Drainage to ditch may be restricted.
	Moderate Defects	2	Flat crown, drainage to ditch restricted.
	Major Defects	3	Reverse crown, bowl-shaped road, drainage on roadway

Rutting

Severity	No Defects	Extent (Length) Low <10%	Med 10-30%	High >30%
Low < 1"		1	2	3
Med 1-3"		4	5	6
High > 3"		7	8	9

Roadside Drainage

Severity	Condition		Description
	No Defects	0	Wide, deep ditches (>4') with no restriction to water flow.
	Minor Defects	1	Adequate ditches (>2' deep), minor obstructions restrict water flow.
	Moderate Defects	2	Shallow, narrow and obstructed ditches. Minor erosion of road.
	Major Defects	3	No ditch, drainage on roadway with moderate to severe erosion.

Potholes

Severity	No Defects	Extent (Area) Low <10%	Med 10-30%	High >30%
Low < 1"		1	2	3
Med 1-3"		4	5	6
High > 3"		7	8	9

Dust

Severity	Condition		Description
	No Defects	0	No obstruction to sight distance.
	Minor Defects	1	Sight distance > 550'
	Moderate Defects	2	Sight distance 225'-550'
	Major Defects	3	Sight distance < 225'

Corrugations

Severity	No Defects	Extent (Length) Low <10%	Med 10-30%	High >30%
Low < 2"		1	2	3
Med 2-4"		4	5	6
High > 4"		7	8	9

* Crown and Drainage are not rated for roads that have no constructed crown or drainage. This applies to Native and Gravel roads.

Loose Aggregate

Severity	No Defects	Extent (Area) Low <10%	Med 10-30%	High >30%
Low < 1"		1	2	3
Med 1-3"		4	5	6
High > 3"		7	8	9

ASPHALT RATING SHEET

Fatigue Cracking

Severity	No Defects	Extent: Low 1 crack WP	Extent: Med 2 cracks WP	Extent: High >30% length
Low-Cracks < 1/4"		1	2	3
Med-Cracks 1/4-3/4"		4	5	6
High-Cracks > 3/4"		7	8	9

Edge Cracking

Severity	No Defects	Extent (Length): Low <10%	Extent (Length): Med 10-30%	Extent (Length): High >30%
0-6" from curb		1	2	3
6-18" from curb		4	5	6
> 18" from curb		7	8	9

Longitudinal Cracking

Severity	No Defects	Extent: Low 1 crack full length	Extent: Med 2 cracks full length	Extent: High >2 cracks full length
Low-Cracks < 1/4"		1	2	3
Med-Cracks 1/4-3/4"		4	5	6
High-Cracks > 3/4"		7	8	9

Block Cracking

Severity	No Defects	Extent (Length): Low > 15x15' squares	Extent (Length): Med 15-10' squares	Extent (Length): High <10x10' squares
Low-Cracks < 1/4"		1	2	3
Med-Cracks 1/4-3/4"		4	5	6
High-Cracks > 3/4"		7	8	9

Transverse Cracking

Severity	No Defects	Extent (ft between cracks): Low > 200'	Extent (ft between cracks): Med 200-50'	Extent (ft between cracks): High < 50'
Low-Cracks < 1/4"		1	2	3
Med-Cracks 1/4-3/4"		4	5	6
High-Cracks > 3/4"		7	8	9

Utility Cuts

Severity	No Defects	Extent (Length): Low <10%	Extent (Length): Med 10-30%	Extent (Length): High >30%
Low-Cracks < 1/4"		1	2	3
Med-Cracks 1/4-3/4"		4	5	6
High-Cracks > 3/4"		7	8	9

Drainage/Roughness/Rutting

Severity	Condition		Description
	No Defects	0	Wide, deep ditches with no obstructions, smooth ride, no rutting, no potholes.
	Minor Defects	1	Drainage may be obstructed, < 1" rutting, minor roughness.
	Moderate Defects	2	Poor drainage, 1-2" rutting, noticeable roughness, potholes < 6" wide.
	Major Defects	3	No drainage; > 2" rutting; potholes 6-12" wide create roughness requiring reduced speeds.

CONCRETE RATING SHEET

Spalling of Joints

Extent (% joints)

Severity	No Defects	Low <10%	Med 10-20%	High >20%
	Low Spalls < 3"	1	2	3
	Med Spalls 3-6"	4	5	6
	High Spalls > 6"	7	8	9

Broken Slabs

Extent (% slabs)

Severity	No Defects	Low <5%	Med 5-15%	High >15%
	Low-no more than 3 pieces, no spalling/faulting	1	2	3
	Med-broken into >3 pieces, spalling/faulting <1/4"	4	5	6
	High-4 or more pieces, spalling/faulting >1/4"	7	8	9

Transverse Cracks

Extent (% slabs)

Severity	No Defects	Low <10%	Med 10-20%	High >20%
	Low-Cracks < 1/8"; no spalling/faulting	1	2	3
	Med-Cracks 1/8-1/2"; spall <3", fault >1/4"	4	5	6
	High-Cracks > 1/2"; spall >3", fault >1/4"	7	8	9

Joint Seal Damage

Extent (%joints)

Severity	No Defects	Low <10%	Med 10-20%	High >20%
	Low <10% joint length	1	2	3
	Med 10-50% joint length	4	5	6
	High >50% joint length	7	8	9

Faulting

Extent (Length)

Severity	No Defects	Low <10%	Med 10-30%	High >30%
	Low < 1/2"	1	2	3
	Med 1/2-1"	4	5	6
	High > 1"	7	8	9

Patch Deterioration

Extent (Area)

Severity	No Defects	Low <10%	Med 10-30%	High >30%
	Low-no fault, no settle at perimeter	1	2	3
	Med-fault & settle <1/4" at perimeter	4	5	6
	High-fault & settle >1/4" at perimeter, cracked patch	7	8	9

Corner Breaks

Extent (% of slabs)

Severity	No Defects	Low <10%	Med 10-20%	High >20%
	Low-corner cracks, no spalling or faulting	1	2	3
	Med-crack slightly spalled & faulted <1/4"	4	5	6
	High-crack highly spalled & faulted >1/4"	7	8	9

Longitudinal Cracks

Extent (% slabs)

Severity	No Defects	Low <10%	Med 10-20%	High >20%
	Low-Cracks < 1/8"; no spalling/faulting	1	2	3
	Med-Cracks 1/8-1/2"; spall <3", fault >1/2"	4	5	6
	High-Cracks > 1/2"; spall >3", fault >1/2"	7	8	9

Map Cracks

Extent (Area)

Severity	No Defects	Low <10%	Med 10-20%	High >20%
	Low-small connected cracks, no spalling	1	2	3
	Med-connected cracks, no spalling	4	5	6
	High-large connected cracks with surface spalling	7	8	9

Deficiency Ratings With Associated Remaining Service Life

Asphalt Rating Sheet

Fatigue Cracking	
Distress Rating	Remaining Service Life
0	20
1	10
2	8
3	6
4	8
5	6
6	4
7	6
8	2
9	0

Edge Cracking	
Distress Rating	Remaining Service Life
0	20
1	12
2	10
3	8
4	10
5	8
6	6
7	8
8	6
9	4

Transverse Cracking	
Distress Rating	Remaining Service Life
0	20
1	14
2	12
3	10
4	12
5	10
6	8
7	10
8	6
9	2

Utility Cuts	
Distress Rating	Remaining Service Life
0	20
1	14
2	12
3	10
4	12
5	10
6	8
7	10
8	6
9	2

Longitudinal Cracking	
Distress Rating	Remaining Service Life
0	20
1	14
2	12
3	10
4	12
5	10
6	8
7	10
8	8
9	6

Block Cracking	
Distress Rating	Remaining Service Life
0	20
1	12
2	10
3	8
4	10
5	8
6	6
7	12
8	6
9	2

Drainage/Roughness/Rutting	
Distress Rating	Remaining Service Life
0	20
1	16
2	10
3	4

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE IN YEARS (Asphalt & Concrete Roads)

RSL	FAILED 0	POOR 1 - 6	FAIR 7 - 12	GOOD 13 - 18	EXCELLENT 19 - 20

Concrete Rating Sheet

Spalling	
Distress Rating	Remaining Service Life
0	20
1	15
2	12
3	10
4	12
5	10
6	8
7	10
8	6
9	0

Broken Slabs	
Distress Rating	Remaining Service Life
0	20
1	15
2	12
3	10
4	12
5	10
6	8
7	10
8	6
9	0

Transverse Cracks	
Distress Rating	Remaining Service Life
0	20
1	18
2	15
3	12
4	15
5	10
6	6
7	10
8	4
9	0

Joint Seal Damage	
Distress Rating	Remaining Service Life
0	20
1	16
2	14
3	12
4	14
5	10
6	8
7	12
8	8
9	6

Faulting	
Distress Rating	Remaining Service Life
0	20
1	15
2	12
3	10
4	12
5	8
6	6
7	10
8	4
9	0

Patch Deterioration	
Distress Rating	Remaining Service Life
0	18
1	16
2	14
3	12
4	12
5	10
6	8
7	10
8	6
9	0

Corner Breaks	
Distress Rating	Remaining Service Life
0	18
1	16
2	14
3	12
4	12
5	10
6	8
7	10
8	6
9	0

Longitudinal Cracks	
Distress Rating	Remaining Service Life
0	20
1	18
2	15
3	12
4	15
5	10
6	6
7	10
8	4
9	0

Map Cracks	
Distress Rating	Remaining Service Life
0	20
1	18
2	15
3	12
4	12
5	10
6	6
7	10
8	4
9	0

Deficiency Ratings With Associated Remaining Service Life

Native Primitive Improved Rating Sheet

Cross Section	
Distress Rating	**Remaining Service Life**
0	10
1	7
2	5
3	0

Rutting	
Distress Rating	**Remaining Service Life**
0	10
1	9
2	7
3	5
4	7
5	4
6	3
7	4
8	2
9	0

Roadside Drainage	
Distress Rating	**Remaining Service Life**
0	10
1	8
2	4
3	0

Potholes	
Distress Rating	**Remaining Service Life**
0	10
1	9
2	7
3	5
4	7
5	4
6	3
7	4
8	2
9	0

Dust	
Distress Rating	**Remaining Service Life**
0	10
1	8
2	6
3	2

Corrugations	
Distress Rating	**Remaining Service Life**
0	10
1	9
2	7
3	7
4	6
5	5
6	5
7	4
8	3
9	0

SUBJECTIVE CONDITION RATING FOR REMAINING SERVICE LIFE IN YEARS (Gravel & Native Roads)

RSL	FAILED 0	POOR 1 - 2	FAIR 3 - 4	GOOD 5 - 7	EXCELLENT 8 - 10

Gravel Rating Sheet

Cross Section	
Distress Rating	**Remaining Service Life**
0	10
1	7
2	5
3	0

Rutting	
Distress Rating	**Remaining Service Life**
0	10
1	9
2	7
3	5
4	7
5	4
6	3
7	4
8	2
9	0

Roadside Drainage	
Distress Rating	**Remaining Service Life**
0	10
1	8
2	4
3	0

Potholes	
Distress Rating	**Remaining Service Life**
0	10
1	9
2	7
3	5
4	7
5	4
6	3
7	4
8	2
9	0

Dust	
Distress Rating	**Remaining Service Life**
0	10
1	8
2	6
3	2

Corrugations	
Distress Rating	**Remaining Service Life**
0	10
1	9
2	7
3	7
4	6
5	5
6	5
7	4
8	3
9	0

Loose Aggregate	
Distress Rating	**Remaining Service Life**
0	10
1	9
2	8
3	7
4	8
5	7
6	6
7	5
8	3
9	0